UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,821	07/16/2003	Vadim Kutsyy	CYTOP110	1277

22852 7590 07/28/2006

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER	
SKIBINSKY, ANNA	

ART UNIT	PAPER NUMBER
1631	

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/621,821	KUTSYY ET AL.	
	Examiner	Art Unit	
	Anna Skibinsky	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Reply to Applicant's Amendments

Amendments to claim 15, 20, 24, and 25 are acknowledged. Claims 1-14 have been cancelled. Claims 15- 26 are under examination.

Claim Rejections - 35 USC § 101

Claims 15-26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 15-26 are drawn to methods which characterize a treatment applied to cells via imaging the cells, identifying signatures as a result of the treatment or lack thereof, and calculating metrics. These claims produce a result which does not meet the standard of being concrete, tangible and useful, as required.

Though the properties calculated by the model are physical properties, the data is nontheless generated within a computer without a physical manifestation. Thus, these claims do not produce a result which meet the standard of being concrete, tangible and useful.

The claims "must be for a practical application of the abstract idea, law of nature, or natural phenomenon. Diehr, 450 U.S. at 187, 209 USPQ at 8 ("application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."); Benson, 409 U.S. at 71, 175 USPQ at 676 (rejecting formula claim because it "has no substantial practical application").

To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways:

1) The claimed invention "transforms" an article or physical object to a different state or thing.

2) The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed in MPEP 2106, and See also:

http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf

The manipulation of coordinates and interaction energies or residues to calculate the crossover point is the manipulation of numbers, performed by the computer implementing programs and is therefore nonstatutory subject matter. Manipulation of data does not include a physical transformation outside of a computer or representation thereof. A process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and is not deemed to be concrete, tangible, and useful and is therefore non-statutory. An example which would make the instant method steps statutory would be to include a step of displaying the data for a user. Hence, the data would become concrete, tangible, and useful.

REPLY TO REMARKS

Applicant's arguments filed 4/21/06 have been fully considered but they are not persuasive.

Applicants state (Remarks of 4/21/06, page 7) that claim 15 recites applying a treatment to a population of cells. However, this recitation is in the preamble of claim 15.

In response to applicant's arguments, the recitation "[a] method of characterizing a treatment applied to a population of cells" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Applicants also point to lines 5, 9, 13, 15 and 16 of claim 15 which recite "creating" and "comparing". Though the recited "creating" and "comparing" suggests a comparison, it does not specifically state a result or a physical transformation step. The analysis of images as claimed is done computationally without the conveying of a tangible result or communicating a result to a practitioner of the method.

Applicants state (Remarks of 4/21/06, page 8) that the method can be carried out with without utilizing a computing device. However, the claims are not limited to the use of a physical apparatus and embody a non-statutory processes, such as one carried out within the processor of a computer without a physical transformation or resultant display

Claim Rejections - 35 USC § 112-2nd paragraph

The rejection of claim(s) 24-26 for being Vague and Indefinite under 35 USC § 112-2nd paragraph in the Office Action filed January 27, 2006, 2006 is withdrawn in view of Applicant's Remarks/Amendments filed April 21, 2006

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 15-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US Patent No. 6611833, filed June 23, 1999) in view of Friend et al. (US Patent No. 6,801,856, filed December 23, 1998).

3. As in instant claim 15-17, Johnson teaches a database of "blueprints" of cellular tissue where statistical characteristics of tissue are collected after a population of tissue is profiled through imaging methods (col. 1, lines 45-56 and col. 2, lines 14-48). The tissues are profiled and a plurality of structural indices are generated (col. 3, lines 5-59 and col. 4, lines 45-67). The distribution of measured characteristics are calculated and stored for "normal" and "abnormal" tissue (col. 5, lines 27-52). The "normal" and "abnormal" tissue can then be accessed by a user who would like to compare samples to the tissues in the database.

4. As recited in instant claims 15-17, the prior art of Johnson teaches the imaging of a population of cells, creating the on-target effect signature which is the characteristic for which an index is measured for "normal" tissue, and a side effect signature which is the characteristic of "abnormal" tissue that is either stored in the database or in the possession of the user (col. 21, lines 24-43). Comparisons can be made between the features of the "normal" and "abnormal tissue".

5. The prior art of Johnson does not teach exposing the tissue to a treatment (as recited in line 3 of instant claim 1) and evaluating a metric derived from an on-target signature and side effect signature to characterize the treatment (as recited in line 14 of instant claim 1).

6. Friend et al. teaches obtaining a response profile for a compound to determine if the compound exhibits an "ideal" vs. a "non-ideal" effect. The prior art of Johnson et al. involves treating cells with a drug to measure drug effectiveness and toxicity (col. 2, lines 42-62). The calculation of a similarity metric for comparing biological response profiles is also taught (col. 4, lines 27-38).

7. As in instant claims 19-21, Johnson teaches deriving an "on-target metric" and "side effect metric" in the form of indices of "normal", "abnormal", and user introduced tissue. The metrics are the index values referred to throughout the text which are calculated from the various signature characteristics determined from the imaging. For example cellular DNA and mRNA characteristics and indexes are discussed (col. 15, lines 9-44). The control group (as recited in instant claim 20) is either the "normal" or "abnormal" tissue data in the database accessed by the user (col. 21, lines 24-43). The

imaging (as recited in instant claim 21) is taught for profiling the tissue specimens (col. 3, lines 25-35).

8. Johnson does not teach varying the doses of treatment (as in instant claim 19).

9. Friend et al. teaches building "consensus profiles" for response of cells to various drugs by exposing them to graded levels of the drugs (col. 6, lines 1-19).

10. Johnson teaches the measurement of qualitative data from cellular features determined from images. The data can be accessed by users to compare different states the tissue against the tissue in the database to determine it there has been a response which is "normal" or "abnormal". Though Johnson recites that the inventions can be used for drug development, he does not specifically recite varying the exposing the cellular tissue to treatment (instant claim 18). Additionally, Johnson does not perform calculations in multivariate space (instant claims 22 and 23).

11. Friend et al. however does teach exposing cells to drug treatment, monitoring them for "ideal" and "non-idea" effects, and based on generated profiles identifies compounds with the desired activity (col. 6, lines 1-19 and col. 8, lines 19-51). Additionally, the calculation of metrics are specifically taught (col. 4, lines 27-38). The use of multivariate space is used to calculate the biological profiles (col. 12, lines 41-62). Data is clustered and the distances between the clusters is calculated (col. 20, lines 30-40).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have implemented the invention of Johnson where images of "normal" and "abnormal" cell tissues are taken and the quantitative properties

of cellular features are measured to form indices that can be accessed and used for comparison. One of skill in the art would have been motivated to use such a system of categorizing cellular data since image analysis can reveal data about cellular states. One of skill in the art would have had the further motivation to treat the cells with various doses of drug candidates and determine the responses with image analysis as taught by Friend et al. The classification of image data as taught by Johnson is not limited to tissue that is "normal" or "abnormal" and can be used to categorize and study the cellular expected or unexpected side effect response of cells when subjected to drug treatment (Johnson, col. 21, lines 5-6). One of skill in the art would have had a reasonable expectation of success at using the imaging and measurement of quantitative characteristics of cells as taught by Johnson et al. (col. 1, lines 45-56 and col. 2, lines 14-48) on the drug candidate treated cells of Friend et al. The multivariate space calculations as taught by Friend el al. could have also formed the indices of quantitative values forming the database in Johnson et al. (col. 3, lines 5-59 and col. 4, lines 45-67). Therefore, the invention as a whole would have been prima facie obvious, absent evidence to the contrary.

REPLY TO REMARKS

Applicants agrue that the on target effect signature and the side effect signature are both derived from the same population of cells. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., target effect signature and the side effect

signature are both derived from the same population of cells) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Claim 15, line 9 recites "creating a side effect signature" without specifying that this side effect signature is derived from the same population of cells as the on target effect signature recited in line 5. Thus, the two signatures are not limited to being created from the same population of cells.

Applicants state that Johnson et al. does not derive both an on-target effect and side effect signature following a treatment. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., target effect signature and the side effect signature are derived following a treatment) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Claim 15 recites deriving a plurality of cellular features from images of cells that have been exposed to a treatment but does not limit the creating of the on-target effect and side effect signature after exposure to a treatment. The claim is not specifically limited to the creating of the signatures after treatment but simply states (lines 5-6) "creating an on-target effect signature which is characteristic of an on-target effect of the treatment". However the embodiment recited in Applicant's Remarks was nevertheless

give to the claim as recited in the obviousness 103(a) rejection above and in the Office Action of 1/27/2006. As stated in the above reiterated 103(a) rejection Friend et al. teach the study of cellular profiles for effects after treatment with a compound.

Applicant states that there is a missing motivation of combine the teachings of Johnson with Friend et al. As stated above, both Johnson et al. and Friend et al. study the profiles of cells (see Abstracts of Johnson and Friend et al.). Indices of cellular characteristics are determined in Johnson (Abstract) to build profiles. Likewise, in Friend et al. profiles of cells are created after treatment with a drug (Abstract). It would be obvious to perform the method of Johnson after exposing the tissue to drugs as taught by Friend et al. since the teachings of both Johnson and Friend et al. can be applied to drug design (e.g. Johnson, col. 21, lines 5-6 and Friend et al., Abstract, lines 14-16).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Skibinsky whose telephone number is (571) 272-4373. The examiner can normally be reached on 8 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272-0811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anna Skibinsky, PhD

ANDREW WANG
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600